

## *Environmental Science:*

### **METAL RESISTANCE IN SOIL BACTERIA ISOLATED FROM A LEAD CONTAMINATED SITE**

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Missouri is one of the many states affected by lead contamination in the soil. To date, the only way that this pollution can be removed is by complete removal of the contaminated soil. This is a very costly procedure that does not completely solve the problem since the new soil is just as susceptible to lead contamination. Bioremediation, using naturally occurring organisms to clean up pollution, may provide a long-term solution, if bacteria can be found that are capable of separating lead from soil.

The main goal of this research is to find a lead sequestering, soil improving bacteria. In an effort to learn more about microbial mechanisms of lead resistance, soil samples were taken near a smelting facility in Eastern Missouri. Bacteria obtained from this soil were found to be resistant to varying levels of lead, cadmium, copper, cobalt, zinc, and mercury. Although not much is known about how bacteria detoxify lead, there is information about the genetics and physical mechanisms of cadmium, copper, and mercury resistance. By testing bacterial resistance to a wide range of metals, a pattern may emerge that suggests lead resistance is carried out in a similar manner to the known metal resistances.

Eighteen isolates were found that grow in the presence of 4 millimolar (mM) lead. Two of the isolates demonstrated unusual metal resistance patterns, one resistant to lead and 0.1 mM mercury, the other to lead, 8mM copper and 4 mM zinc. Both isolates belong to the genus *Variovorax*. This genus is not usually associated with lead tolerance, so this may provide interesting information upon further study.